

## TYPHOON TED (24W)

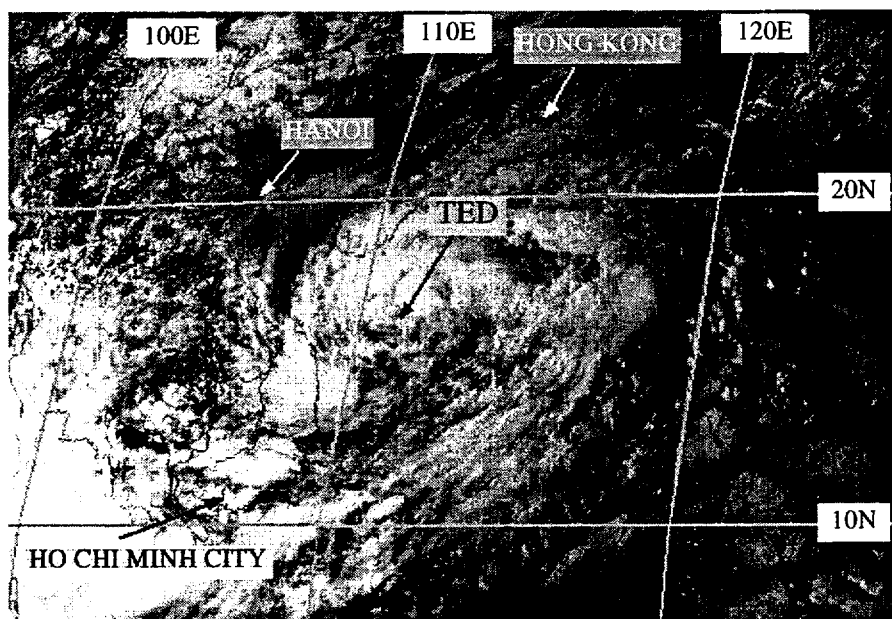
### I. HIGHLIGHTS

Typhoon Ted developed east of the Philippines in the near-equatorial trough. After moving through the islands of the central Philippines as a tropical disturbance, Ted became a typhoon in the South China Sea when south of Hainan Island. As Ted passed into the Gulf of Tonkin, a gust of 111 kt (55 m/sec) was observed at the top (100 m above sea level) of an oil rig, and winds of typhoon force were estimated to have occurred at sea-level by crew members working at the base of the platform. Ted eventually dissipated over the mountains of southern China.

### II. TRACK AND INTENSITY

The tropical disturbance that became Ted can be traced back to a flare-up of deep convection approximately 200 nm (370 km) south-southeast of Ulithi Atoll in the western Caroline Islands that occurred at 031200Z October along the axis of a weak near-equatorial trough. This disturbance was slow to develop and wasn't mentioned by the JTWC until the Significant Tropical Weather Advisory was reissued at 050300Z to include it. The first of two Tropical Cyclone Formation Alerts (TCFAs) was issued at 071800Z when the disturbance went ashore in southeastern Luzon near Legaspi. At this time, the upper-tropospheric flow pattern was deemed by forecasters to be favorable for intensification. The system, however, did not intensify as it passed over the many islands in the center of the Philippine archipelago. With the synoptic environment still appearing to favor intensification, a second TCFA was issued at 081800Z as the disturbance entered the South China Sea.

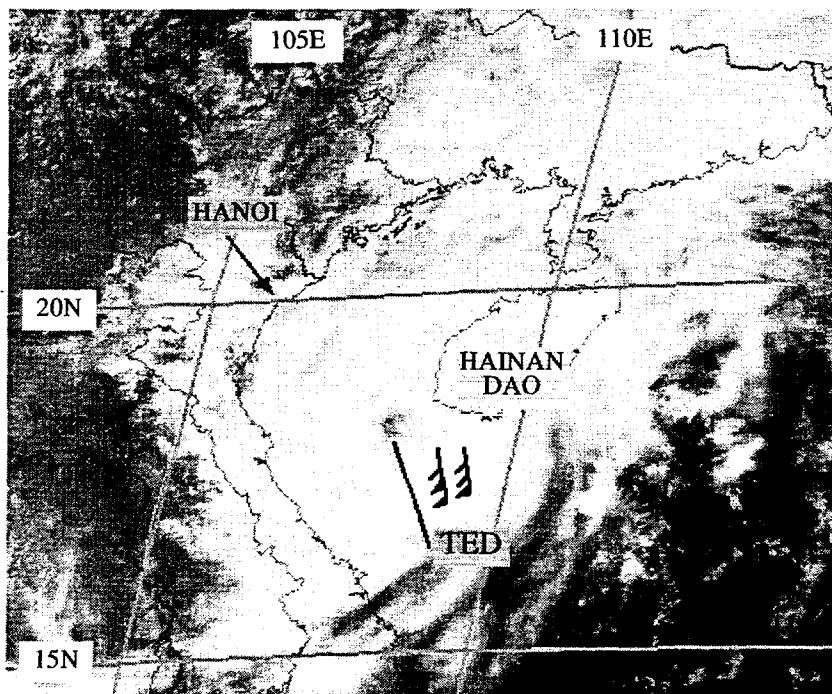
Based on an improved satellite signature and ship reports, the first warning was issued on Tropical Depression 24W (TD 24W), valid at 090000Z. Twenty-four hours later, satellite intensity estimates reached 35 kt (18 m/sec), and TD 24W was upgraded to Tropical Storm Ted on the warning valid at 100000Z. Thereafter, Ted moved westward and continued to intensify (Figure 3-24-1). On 11 October, Ted began to track more northwestward toward the Gulf of Tonkin, and started to intensify at a faster rate.



**Figure 3-24-1** Ted begins to intensify as it nears Hainan Island (100831Z October visible GMS imagery).

Intensity estimates based upon the application of Dvorak's technique to satellite imagery did not provide an accurate picture of Ted's "true" intensity as determined from synoptic data. All warning intensities on 11 October were at least 20 kt (10 m/sec) too low, and all forecasts indicated a weakening trend. However, observations from an oil rig at approximately 120000Z (that were not received at the JTWC until 120600Z) indicated that Ted most probably reached typhoon intensity late on 11 October (see the discussion of Ted's intensity on 11 and 12 October in the next section).

Typhoon Ted reached its peak intensity of 75 kt (39 m/sec) at 120000Z and maintained this intensity for 18 hours. The typhoon continued to track around the west side of Hainan Island with its eye and eye wall remaining just offshore. Late on 12 October, Ted turned to the north-northeast and made landfall near Beihai in southern China as a minimal typhoon. It dissipated rapidly as it moved inland, and the final warning, valid at 131200Z, was issued.



**Figure 3-24-2** Typhoon Ted with the observed winds at an oil rig superimposed. The winds (observed at different times) are plotted relative to Ted's center, not the rig location (120331Z October visible GMS imagery). (Wind data courtesy of Nobel Denton Weather Services Ltd, London).

### III. DISCUSSION

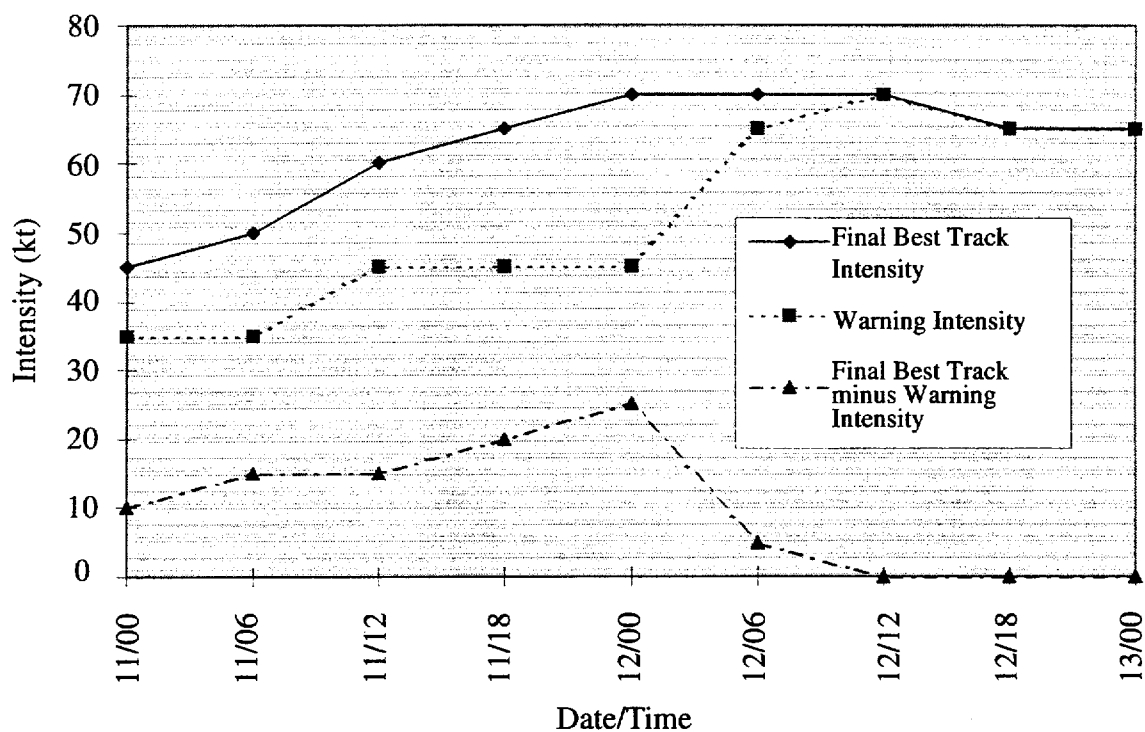
#### *Typhoon intensity revealed by synoptic data*

The peak wind information observed on an oil rig located at 17.9°N 109.7°E (south of Hainan Island) that was passed to the JTWC by Noble Denton Weather Services Ltd. of London, is a good illustration of discrepancies that can occur between surface observations of the winds in a tropical cyclone and the surface wind speed as estimated using currently available satellite techniques. Intensity values yielded by the application of Dvorak's techniques indicated an intensity of 45 kt (23 m/sec) as Ted approached Hainan Dao. Observations from the oil rig, however, indicated that the wind speeds were substantially higher. Wind gusts at the top of the 300 ft (100 m) platform reached a peak of 111 kt (57 m/sec) at 111930Z, while wind speeds near the surface were estimated to be at typhoon force at 120000Z (Figure 3-24-2). Using the reduction scheme for marine observations of Liu et al. (1979) and the gust factors of Atkinson (1974) or Krayner and Marshall (1992), the 111 kt gust at 300 feet yields an estimate of 75 kt (37 m/sec) for the one-minute sustained wind at a height of 10 meters. These synoptic reports were the basis for the upgrade of Ted to typhoon intensity. The graphic in Figure 3-24-3 shows

the influence of synoptic ground truth data on both the warning and the final best track warning intensity.

#### IV. IMPACT

The disturbance that became Ted caused local flooding as it traversed the Philippines. No reports of damage or injuries in either the Philippines or in China were received at the JTWC.



**Figure 3-24-3** The influence of ground truth data at 120000Z (12/00Z) October on both the warning and final best track intensity.